



TRIREME

DIGITAL & GREEN SKILLS TOWARDS FUTURE
OF THE MOBILITY ECOSYSTEM



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REPORT ON WORKSHOPS

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- DELIVERABLE D2.1** “Sectoral Skills Intelligence: Reactive Response” – Part WSs Report

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1 INTRODUCTION

This deliverable presents a summary of the initial series of workshops organized by the TRIEME project, aimed at gathering insights and engaging with key stakeholders to discuss the skills agenda within the Automotive-Mobility Ecosystem. It reflects the discussions and inputs gathered from stakeholders in this first iteration.

TRIEME Work Package 2 (WP2) foresees the roll-out of three continuous main tasks:

- Task 2.1 Desk research
- Task 2.2 Survey
- Task 2.3 Workshops

As part of deliverable 2.1 “Sectoral Skills Intelligence: Reactive Response “, Work Package 2 was expected to conduct three expert workshops under Task 2.3 “Workshops”.

Such workshops represented the first out of the three steps to get insights, new information and prioritisation of information from respondents (stakeholders and public) on the main objectives of WP2, working specifically on selected topics and issues within the sectoral needs or offer – skills needs, job roles needs or offered intelligence, issues and gaps within the automotive-mobility ecosystem. The audience of such workshops are the whole automotive-mobility sector stakeholders, and for this first workshops iteration it mainly included:

- Companies at national and EU level
- VET providers
- Sectoral/industrial Associations
- Academia

2 OBJECTIVES

To get into the methodological approach of the task, the workshops focused on four macro topics and related sub-categories which have been identified as the main trends the project aims at better investigating (please see below). The aim was to **create a common knowledge as well as a state of the art of the automotive-mobility ecosystem from a bottom-up approach**. It should be noted that **such trends and sub-categories are not a definitive list**, rather a list which has been enriched/validated/integrated by the workshop exercises themselves, and the other tasks of WP2 (namely the desk research and the survey).



Figure 1: the four main trends of the TRIEME project

Digitalisation

- Connected vehicles (Internet of Things, V2X coms, Cloud)
- Autonomous Driving (ADAS, Full Autonomy, sensors)
- AI, Machine Learning, Data Analytics
- Cybersecurity (vehicle security, data privacy)
- Digital twins and simulation
- Industry 4.0/5.0
- Virtual/Augmented reality (VR/AR)

Green, Sustainability and Circular Economy

- Electromobility (electric vehicles)
- Hybrid Vehicles (PHEVs, mild hybrids)
- Other alternative fuels and propulsion (hydrogen, e-fuels, CNG, etc.)
- Circular economy (sustainable manufacturing, green manufacturing practices, lifetime maximisation through predictive maintenance, repair and remanufacturing, use of recycled materials)
- Charging infrastructure (expansion of fast-charging networks, development of smart grids for EV charging, V1G, V2G)
- Eco-design innovations (material innovation, tyre performance, aerodynamic design, energy efficiency)
- Corporate sustainability goals (life cycle assessment and management, carbon footprint reductions, carbon neutrality)
- Public perception of Green Transition
- Supply chain sustainability (corporate sustainability due diligence, due diligence vs deforestation and forced labor)

Resilience of Value Chains

- Supply Chain Optimisation (AI & IoT use for real-time monitoring)
- Local Sourcing and Production (local supply, dependency reduction, diversification of suppliers)
- Inventory Management (just-in-time inventory systems, advanced analytics for demand forecasting)
- Risk Management (scenario planning, strategic stockpiling)
- Manufacturing and production technologies innovation (robotisation, scaling and production ramp-up)
- Predictive maintenance
- Testing and approval (homologation, current vehicle norms and standards, legislation)

New Business Models

- Digital Retail (online sales platform, virtual showrooms, dynamic customer retail models, car configurators)
- Subscription Services (vehicle subscriptions, flexible leasing options)
- Mobility as a Service (ride-hailing services, car-sharing platforms, integrated mobility solutions)
- Tyre as a Service
- Maintenance as a Service

- Aftermarket Services (digital platforms for maintenance and repairs, on-demand parts and services, dynamic customer preferences)
- Dynamic customer preferences (Total Cost of Ownership, Total Cost of Mobility, infotainment)
- Customer services innovations and adaptations (after-sales, car modifications, EV-cars maintenance, etc.)
- Fleet management

3 METHODOLOGY

The TRIEME active partners on this task have held **five workshops**¹ to accomplish the aforementioned objectives (more information on the workshops can be found in chapter 6 “Annexes”):

- 1) Workshop in the framework of the “TRIEME Project Conference”, held on April 10th, 2024 in Brussels
- 2) Workshop in the framework of the “Future Skills for the Battery Industry”, held on June 19th, 2024 in Stuttgart
- 3) Workshop in the framework of the “Grand Est Study Visit”, held on June 27th, 2024 in Strasbourg & Metz area
- 4) Workshop in the framework of the “31st EuroSPI conference”, held on September 5th in Munich
- 5) Workshop in the framework of the “Turn2Coach: the metacompetencies of the VET trainer”, held on September 9th in Italy.

All workshops followed an **agreed and unified methodology to gather inputs and feedback from participants**, which was composed of:

1. **A SET OF PRE-DETERMINED QUESTIONS** for the participants, which have investigated the below areas:
 - Relevance of the trend/sub-category presented
 - Importance and prioritisation areas within the trend
 - If there are more trends/sub-categories the audience wanted to add to the list
 - First investigation on the needs in terms of skills, job roles and training offer that are related to the trends.

¹ As per project application, Deliverable 2.1 envisages the roll out of three workshops. The partnership had the possibility to organize and be part of more than three workshops, therefore producing additional outputs compared to what was foreseen.

2. **A SUBSEQUENT COMPLETION OF A SWOT ANALYSIS:** this represented the main written output of the workshop, condensing the information that have emerged from the questions. The SWOT analysis provides a more structured output on the state of the art of the ecosystem in terms of skills intelligence across the four main trends above identified.

<p>Strengths (S):</p> <ul style="list-style-type: none"> ➤ List of internal strengths and competitive advantages ➤ Strong internal resources (financial, human, technological, etc.) ➤ Competitive advantages ➤ Reputation ➤ Unique capabilities ➤ Operational efficiency 	<p>Opportunities (O):</p> <ul style="list-style-type: none"> ➤ Identification of external opportunities that could have a positive impact ➤ Favourable market trends ➤ Regulatory changes that can be beneficial ➤ New technologies or emerging markets ➤ Potential collaborations ➤ Growing consumer demand
<p>Weaknesses (W):</p> <ul style="list-style-type: none"> ➤ List of internal weaknesses ➤ Resource constraints ➤ Lack of key skills ➤ Inefficient internal processes ➤ Dependence on specific suppliers ➤ Lack of presence in certain markets 	<p>Threats (T):</p> <ul style="list-style-type: none"> ➤ Identification of external threats that could negatively affect the company's operations ➤ Intense competition ➤ Changes in the economic environment ➤ Adverse political or legal factors ➤ Technological advances that can render products or services obsolete ➤ Public relations crisis

Figure 2: Questions and guidelines to complete the SWOT analysis

4 RESULTS

The following sub-sections summarise the key results for each of the four trends identified and follow the methodology described in chapter 3. After a description of the trend, the results of the key questions presented to the audience are described, along with a merged version of the SWOT analysis based on the data gathered during the workshops.

4.1 DIGITALISATION TREND

Digitalization is transforming the automotive industry by enhancing digital services and connectivity, utilizing technologies such as digital twins, simulation, virtual and augmented reality (VR and AR), and autonomous driving. As the sector embraces these advancements, it presents both substantial strengths and notable challenges.

The digitalization trend is characterized by several key strengths that can drive the industry forward. Efficiency is significantly enhanced through the use of advanced technologies, allowing for streamlined operations and reduced timeframes. Security measures are becoming more robust, addressing the increasing importance of safeguarding data in a connected environment. Data archiving for analysis enables companies to leverage historical data for informed decision-making and optimization strategies. Furthermore, convenience and operational speed are markedly improved, leading to better user experiences and enhanced service delivery. Lastly, performance improvement is a continuous goal, pushing companies to innovate and optimize their processes further. The landscape of digitalization is rife with opportunities that can shape the future of the automotive industry. Standardization of digital processes can facilitate interoperability and compatibility, paving the way for more seamless integration of technologies. The emergence of new professional roles will be essential as companies adapt to the evolving digital landscape, requiring a workforce equipped with the necessary skills to harness these technologies effectively. Alternative maintenance services, driven by digital solutions, can enhance customer satisfaction and create new revenue streams. Interconnection among users fosters collaboration and community building, enabling shared mobility solutions. Technological

innovation, particularly through artificial intelligence (AI), can drive further advancements in efficiency, safety, and user experience.

Despite the strengths and opportunities, the digitalization trend also reveals significant weaknesses that need to be addressed. High costs associated with the implementation of new technologies can be a barrier for many companies, especially smaller firms struggling to invest in digital infrastructure. There are noticeable skill gaps in the workforce, as many employees may not possess the necessary training to navigate the complexities of digital tools. Additionally, the poor preparedness of the current audience for these digital shifts can lead to resistance and slow adoption, hindering progress. Similarly, the digitalization landscape is not without its threats. Geopolitical instability can impact supply chains and market conditions, introducing uncertainty for companies aiming to invest in new technologies. Furthermore, global competition is intensifying as automotive manufacturers worldwide strive to adopt digital innovations, which may put pressure on established firms to keep pace or risk losing market share.

TREND 1: DIGITALISATION
Relevance of the trend/sub-category presented

1. Digitalisation is crucial for modernizing industries, especially in sectors like automotive, which need to adapt to new technological trends like AI, automation, and big data. It's also essential for streamlining processes, improving production efficiency, and enhancing collaboration across regions.
2. AI and predictive systems are highly relevant, where they are key to improving production efficiency, quality control, and optimizing processes.
3. Highly relevant as digitalization is recognized as a main driver of change across the automotive ecosystem, impacting production, products, and business models.

Importance and prioritisation areas within the trend

1. Priorities include developing infrastructure, enhancing data collection and monitoring, and integrating digital solutions across industries to foster innovation and improve communication between stakeholders.
2. AI-driven predictive analytics should be prioritized, especially in areas such as supply chain optimization, production quality, and advanced vehicle maintenance systems.
3. Prioritized in all areas due to its role in transforming automotive processes, with significant focus on software and systems integration.

More trends/sub-categories the audience wanted to add to the list

1. The rise of AI and machine learning, cloud computing, and cybersecurity are important digitalisation trends that should be added to the list for discussion.
2. Additional trends like blockchain for secure data management and IoT for real-time diagnostics should be considered for enhancing operational transparency and efficiency.

First investigation on the needs in terms of skills, job roles and training offer that are related to the trends.

1. Key skill requirements include proficiency in digital tools, data analysis, programming, and cybersecurity. There is also a need for retraining workers, particularly older employees, to ensure they can adapt to these technologies.
2. New skills needed will focus on AI systems management, data science, and cybersecurity, while new roles may include AI specialists and digital supply chain managers. Training programs should emphasize data analytics, automation technologies, and AI-driven production systems.
3. Increasing demand for software engineers, data analysts, and experts in AI-driven systems.

Table 1: Digitalisation key questions and answers

STRENGTHS	OPPORTUNITIES
<ul style="list-style-type: none"> • Strong technological capabilities in software development and integration • High operational efficiency with digital tools in production and business processes • Competitive advantage in AI-driven systems and data analytics • Automotive Security • Data archiving for analysis • Convenience and operational speed • Performance improvement • Competitive advantage • Strong talent pool in IT and digital skills in many regions • Significant investments in digital skills, particularly in AI, predictive systems and quality improvement. • Emphasis on reskilling and upskilling in digital areas, helping to address the increasing need for engineers and other skilled professionals in the digital sector. • Partnerships with education providers to ensure training systems are aligned with industry needs, particularly in AI and electronics 	<ul style="list-style-type: none"> • Expanding digitalization across product design, production, and customer services • Favorable market trends toward smart and connected vehicles • New collaborations with tech companies • Standardization • New professional roles • Alternative maintenance services • Interconnection among users • Technological innovation (AI): emergence of AI and machine learning to enhance industry practices • Partnerships in cybersecurity and cloud computing • Increasing demand for digital solutions across sectors • Growing demand for digital transformation in the automotive industry, offering opportunities to innovate production processes. • Potential for cross-border collaboration on digital projects through initiatives like Erasmus+ to enhance digital training and education. • Development of digital ecosystems through partnerships with regional and European stakeholders, increasing competitiveness in the global market
WEAKNESSES	THREATS
<ul style="list-style-type: none"> • Potential skills gaps in emerging digital technologies like AI and IoT (e.g., lack of digital literacy among older workers) • Dependence on specific suppliers for digital infrastructure: • Lack of infrastructure and resources for training with electric vehicles at the vocational schools highlights logistical and technical challenges. • High costs • Poor preparedness of the current audience • Inefficiency in aligning educational systems with industry needs • Regional and economic disparities in digital infrastructure 	<ul style="list-style-type: none"> • Rapid technological changes could outpace skills development • Increasing competition from tech-oriented automotive firms • Intense competition for digital talent, especially with industries outside the automotive sector also competing for workers with AI, engineering, and electronics skills. • Potential cybersecurity risks as digitalization expands. • Technological barriers • Regulatory risks and competition • Fast technological advancements making current systems obsolete • Economic downturns could reduce the budget available for digital upskilling and infrastructure investments

Figure 3: Digitalisation SWOT analysis

4.2 GREEN, SUSTAINABILITY AND CIRCULAR ECONOMY TREND

The automotive industry is increasingly embracing the principles of green practices, sustainability, and a circular economy. This trend focuses on electromobility, the adoption of alternative fuels, and innovative approaches to resource management, aiming to create a more sustainable future for transportation.

At the forefront of this movement is the ongoing research into alternative fuels and materials. This research is crucial for developing cleaner, more efficient energy sources that can significantly reduce the environmental impact of vehicles. The commitment to reducing environmental footprints reflects a broader recognition of the industry's role in combating climate change and promoting sustainability. This trend also presents numerous opportunities for growth and innovation. The development of innovative solutions that incorporate sustainable practices can lead to breakthroughs in vehicle design, manufacturing processes, and energy efficiency. New automotive trends are emerging, driven by consumer demand for greener alternatives and smarter technologies. Additionally, state funding and incentives play a pivotal role in encouraging businesses to invest in sustainable practices, helping to offset costs and foster innovation within the industry.

However, the transition to a green and sustainable model is not without its challenges. High costs associated with the development and implementation of alternative fuels and sustainable technologies can be a significant barrier, particularly for smaller companies that may lack the necessary resources. Additionally, bureaucracy and regulatory obstacles can complicate the adoption of new practices, creating delays and hindering progress toward sustainability goals. The path toward sustainability faces several threats as well. The presence of non-recyclable materials continues to pose a challenge, complicating efforts to create a truly circular economy. Dependence on foreign countries for key materials and technologies can expose the industry to geopolitical risks and supply chain vulnerabilities. Furthermore, speculation favoring regulatory gaps may lead to inconsistent practices across the industry, undermining the collective efforts to achieve sustainability.

TREND 2: GREEN, SUSTAINABILITY AND CIRCULAR ECONOMY
Relevance of the trend/sub-category presented

1. Highly relevant given the global push towards reducing carbon footprints and achieving net-zero emissions. The automotive and manufacturing sectors need to pivot towards sustainable practices, such as the use of renewable energy and circular resource management.
2. The transition to electric vehicles (EVs) and adherence to EU regulations like Fit for 55 are highly relevant, particularly in reducing emissions and promoting sustainability within the automotive sector.
3. Essential, particularly when discussing electric vehicles and regulatory pressures. Participants debated whether customer demand or regulation drives EV adoption.

Importance and prioritisation areas within the trend

1. Prioritisation should be on creating eco-friendly production processes, reducing waste, and fostering innovation in recycling and material reusability.
2. Reskilling for EV production and maintenance should be prioritized, along with innovations in battery recycling and sustainable material sourcing to reduce waste and support circular economy models.
3. High priority as sustainability impacts business models and product design, especially for EVs and hybrids.

More trends/sub-categories the audience wanted to add to the list

1. There's a need to explore alternative fuels, electric vehicle infrastructure, and innovations in sustainable supply chains and production materials.
2. Consider adding trends like hydrogen fuel cells and energy-efficient manufacturing processes to further support the green transition in the industry.
3. Focus on battery technology and lifecycle sustainability could expand.

First investigation on the needs in terms of skills, job roles and training offer that are related to the trends.

1. The green economy demands skills in sustainable manufacturing, renewable energy management, and lifecycle analysis. Career guidance systems can support young people to enter these emerging green job roles.
2. Skills in battery technology, EV systems maintenance, and sustainable manufacturing practices will be essential. New roles will focus on sustainability managers, EV technicians, and circular economy specialists, with corresponding training in green technologies and sustainable production.
3. Roles in battery technology, environmental engineering, and sustainability experts are becoming critical.

Table 2: Green, Sustainability and Circular Economy key questions and answers

<p>STRENGTHS</p> <ul style="list-style-type: none"> • Strong internal focus on sustainability as a key strategy. • Reputation for advancing green technologies like electric vehicles (EVs). • Unique capabilities in sustainable product design and production. • Research on alternative fuels and materials • Reduction of environmental impact • Development of small realities • Strong commitment from EU on green policies and funding • Positive public perception of sustainable businesses 	<p>OPPORTUNITIES</p> <ul style="list-style-type: none"> • Favorable regulatory changes promoting sustainability and emissions reduction. • Growing consumer demand for sustainable products • Opportunities in circular economy models for battery recycling and reusing materials • Development of innovative solutions • New automotive trends • Expansion in renewable energy markets • Regulatory support through EU Green Deal and funding for innovation • Collaboration in circular resource management and recycling
<p>WEAKNESSES</p> <ul style="list-style-type: none"> • Resource constraints related to the development of sustainable technologies. • Lack of key skills in environmental engineering and battery technologies. • Dependence on raw material suppliers for EV components. • Bureaucracy and regulatory obstacles • Inconsistent policies across member states 	<p>THREATS</p> <ul style="list-style-type: none"> • High competition in the EV market with sustainability at the core. • Economic fluctuations affecting green investment. • Supply chain disruptions, especially for rare materials like lithium. • Non-recyclable materials • Dependence on foreign countries • Speculation favoring regulatory gaps • Difficulty in securing financing for green innovations

Figure 4: Green, Sustainability and Circular Economy SWOT analysis

4.3 RESILIENCE OF VALUE CHAINS TREND

The resilience of value chains is becoming increasingly vital in the automotive industry as companies navigate complex global landscapes and respond to ever-changing market demands. This trend emphasizes the importance of robust logistics, material and software resiliency, repair and maintenance capabilities, and effective manufacturing processes.

A key strength of this trend is the strong know-how inherent in the automotive sector. The wealth of experience and expertise within the industry positions companies to effectively address challenges and seize opportunities. Digitalization and automation further enhance resilience, allowing for streamlined processes, real-time data analysis, and improved decision-making. These technological advancements lead to greater efficiency in procurement, enabling firms to optimize their supply chains and reduce costs while maintaining high standards of quality. The resilience of value chains presents numerous opportunities for growth and innovation. The implementation of innovative technologies can significantly enhance operational capabilities, enabling companies to respond swiftly to disruptions and changes in demand. Embracing new solutions—such as advanced analytics, AI, and IoT—can lead to improved logistics, better inventory management, and enhanced customer experiences. Additionally, the potential for growth and innovation in this area is substantial, as companies seek to build more agile and adaptive supply chains that can withstand external pressures.

Despite these strengths and opportunities, several weaknesses must be addressed. One critical issue is the failure to leverage existing know-how effectively. While the automotive sector possesses a wealth of knowledge, not all companies fully utilize this expertise in their operations, leading to missed opportunities for improvement. Furthermore, the complexity of modern supply chains compared to older, more traditional models can create challenges. Companies may struggle to adapt to new processes, leading to inefficiencies and potential disruptions. The resilience of value chains is also threatened by several external factors. Geopolitical instability can have far-reaching consequences for supply chains, impacting everything from raw material availability to transportation routes. Companies must navigate these uncertainties while maintaining their operational integrity. Additionally, global

competition is fierce, with companies from around the world vying for market share. This heightened competition necessitates continuous improvement and innovation, pushing firms to enhance their resilience or risk being outpaced by more agile competitors.

TREND 3: RESILIENCE OF VALUE CHAINS
Relevance of the trend/sub-category presented

1. Essential in ensuring that disruptions—like those seen during the pandemic—do not affect production. This is especially critical in regions transitioning to new technologies and green energy.
2. The collaboration between regions and industry partners is highly relevant for building resilient value chains that can adapt to disruptions like electrification and the transition to EVs.
3. Relevant but discussed in the context of ensuring supply chain adaptability, especially as companies transition to new vehicle technologies (EVs, hybrids).

Importance and prioritisation areas within the trend

1. Prioritisation areas should include diversifying supply chains, improving monitoring and forecasting, and enhancing the flexibility of production to withstand external shocks.
2. Building regional collaboration networks and digitalizing supply chains for transparency and flexibility should be prioritized to improve adaptability to changes.
3. Important for maintaining operational stability amidst industry shifts.

More trends/sub-categories the audience wanted to add to the list

1. Technologies such as blockchain for supply chain transparency and the adoption of regional clusters of industries are key trends that should be considered.
2. Additional trends such as decentralized production and local sourcing could help strengthen resilience against global disruptions.
3. Suggestions for adding focus on logistics and global supply chain disruptions.

First investigation on the needs in terms of skills, job roles and training offer that are related to the trends.

1. There is a need for logistics management, supply chain analytics, and crisis management skills to ensure that supply chains remain resilient. Workers will also require adaptability and problem-solving skills in times of crisis
2. Skills in supply chain management, digital logistics, and risk mitigation will be necessary. New roles may include supply chain risk managers and digital transformation officers, supported by training in digital logistics platforms and crisis management.
3. Increased focus on logistics, supply chain management, and risk management.

Table 3: Resilience of Value Chains key questions and answers

<p>STRENGTHS</p> <ul style="list-style-type: none"> • Strong operational processes for supply chain management. • Focus on building a pool of critical skills and creating partnerships with suppliers, such as in logistics and supply chain management, to ensure value chain resilience. • Competitive advantage through supply chain optimization strategies. • Digitalization and automation • Greater efficiency in procurement • Strong regional collaboration between industry, government and education to address challenges in the automotive value chain and solve logistical challenges like commuting issues, which strengthens workforce retention and availability • Ability to adapt and innovate within the industry • EU support through just Transition Mechanism 	<p>OPPORTUNITIES</p> <ul style="list-style-type: none"> • Adoption of advanced logistics and digital tools (such as blockchain) to strengthen value chain resilience and transparency • Supply chain innovation, optimization, flexibility and security • Resilience-building through partnerships with European regions and cross-border initiatives aimed at enhancing data-sharing and skills development. • Opportunity to redesign supply chains to focus on sustainability, reducing dependencies on non-green technologies and optimizing for green logistics. • Potential for emerging markets in EV components and battery supply chains to contribute to regional value chain strength. • Growth in regional clusters as center of innovation
<p>WEAKNESSES</p> <ul style="list-style-type: none"> • Lack of redundancy in global supply chains. • Dependence on few critical suppliers, regions and specific job roles, such as mechanical and metalworking jobs, which are becoming obsolete due to automation and the shift towards electrification with consequent difficulties in quickly retraining workers • SMEs may lack the financial resources to cope with disruptions in the value chain, especially during the transition to electric mobility. • Inefficient crisis management strategies • Lack of integrated data sharing across supply chains 	<p>THREATS</p> <ul style="list-style-type: none"> • Global supply chain disruptions such as raw material shortages, geopolitical factors (including new EU regulations), natural disasters or pandemics. • Intense competition for supply chain resources, especially in EV components. • Technological advances in competitors' supply chains that could outpace the company • Economic volatility, such as inflation or downturns, could weaken the resilience of regional value chains. • Rising costs of materials and transportation, lower competitiveness

Figure 5: Resilience of Value Chains SWOT analysis

4.4 NEW BUSINESS MODELS TREND

The emergence of new business models is reshaping the automotive-mobility landscape, driven by innovations such as Mobility as a Service (MaaS), Tyre as a Service, Maintenance as a Service, and evolving customer preferences. This trend reflects a fundamental shift in how services are delivered and consumed in the mobility sector, focusing on convenience, accessibility, and sustainability.

One of the key strengths of this trend is the enhancement of infrastructure. As cities and companies invest in better transportation networks and digital platforms, they create an environment conducive to the growth of new business models. This infrastructure supports innovative services, allowing for smoother interactions between providers and consumers. Additionally, the creation of new services tailored to customer needs fosters engagement and loyalty, enabling companies to differentiate themselves in a crowded marketplace. These strengths empower organizations to adapt quickly to changing market dynamics and consumer expectations. The potential for innovation and differentiation within this trend is vast. Companies can leverage technology to create unique service offerings that cater to the specific needs and preferences of their customers. By utilizing data analytics, firms can gain insights into consumer behavior, enabling them to tailor services more effectively and enhance customer experiences. This drive for innovation not only helps organizations stay relevant but also opens up new revenue streams and market segments, making it essential for companies to remain agile and forward-thinking.

However, the transition to new business models is not without its challenges. A conservative mindset prevalent in many established organizations can hinder the adoption of innovative approaches. Companies may be resistant to change, preferring to stick with traditional models that have served them well in the past. Additionally, the difficulty of adapting to these changes can create friction within organizations, leading to slower implementation and missed opportunities for growth. Overcoming these weaknesses will require a cultural shift that embraces innovation and encourages risk-taking.

The landscape for new business models is also fraught with threats. Intense competition from both established players and new entrants can put pressure on companies to continuously

innovate and improve their offerings. This competition demands that organizations not only keep pace with industry trends but also anticipate future developments to maintain a competitive edge. Furthermore, the lack of regulations in certain areas can lead to uncertainty and inconsistencies in service delivery, creating challenges for businesses trying to establish trust and reliability in the market.

TREND 4: NEW BUSINESS MODELS
<p>Relevance of the trend/sub-category presented</p> <ol style="list-style-type: none"> 1. Necessary to cope with the disruptions brought by digitalisation and sustainability trends. This includes shifts towards service-based models, sharing economy platforms, and innovation in financing structures. 2. Integration of new mobility services like shared electric vehicles and the increasing use of AI in production are highly relevant as the automotive industry shifts towards innovative business models. 3. Very relevant as the transition from ICE to EVs requires new strategies for monetization and customer engagement. <p>Importance and prioritisation areas within the trend</p> <ol style="list-style-type: none"> 1. Priorities include adopting circular business models, platform-based approaches, and integrating sustainability into core business strategies. 2. Prioritizing subscription-based models for vehicle usage and AI-driven customization of manufacturing processes can drive new revenue streams and operational efficiency. 3. High priority in terms of aligning business models with customer preferences and regulatory demands. <p>More trends/sub-categories the audience wanted to add to the list</p> <ol style="list-style-type: none"> 1. Expansion of digital marketplaces, micro-services, and subscription-based models should be added to the discussion. 2. Consider adding mobility-as-a-service (MaaS) and data-driven service platforms to expand business model innovation. 3. Need for models that adapt to changing regulations and consumer behavior. <p>First investigation on the needs in terms of skills, job roles and training offer that are related to the trends.</p> <ol style="list-style-type: none"> 1. Entrepreneurial skills, financial management, digital literacy, and marketing will be key for workers adapting to new business models. There is also a need for upskilling in e-commerce and digital platforms. 2. New roles related to business model innovation, AI product managers, and data analysts will emerge, requiring training in subscription management, AI systems, and platform-based business strategies. 3. Roles in business development, market analysis, and strategic planning are crucial as companies pivot to new models (e.g., subscription-based services for EVs).

Table 4: New Business Models key questions and answers

<p>STRENGTHS</p> <ul style="list-style-type: none"> • Unique capability to adapt quickly to evolving market conditions. • Strong customer relationships and brand reputation in traditional and new markets. • Competitive advantage in experimenting with digital business models, such as subscription services for EVs. • Infrastructure enhancement • Creation of new services • Flexibility of platform-based and service-oriented models • Strong interest from young entrepreneurs • Ability to innovate within traditional industries • New business models focused on AI and automation to improve operational efficiency. • The region’s emphasis on reskilling and education reform presents opportunities for innovation in training programs, which could be a unique selling proposition for attracting industry investment. 	<p>OPPORTUNITIES</p> <ul style="list-style-type: none"> • Growing consumer demand for flexible, service-based business models opens up market opportunities for companies that can innovate quickly in these areas • Potential for partnerships with tech companies and service providers. • Favorable market trends toward subscription services, car-sharing, and mobility-as-a-service (MaaS). • Growth in the sharing economy and digital marketplaces • EU funding for innovative business practices and startups • Efficiency gains in manufacturing • New business models focused on electric and hybrid vehicle production, aftermarket services, and vehicle recycling align well with global trends towards sustainability and circular economy principles.
<p>WEAKNESSES</p> <ul style="list-style-type: none"> • Limited presence in emerging markets for alternative business models (e.g., shared mobility). • Lack of experience in non-traditional automotive revenue streams. • Resource constraints for testing and scaling new business models. • Conservative mindset • Overdependence on traditional business models and struggle, especially for SMEs, to adapt to the demands of electric and digital transformations. • Difficulty in finding skilled workers for new models • Fragmentation in business regulations across regions 	<p>THREATS</p> <ul style="list-style-type: none"> • Rapidly changing regulations and technical disruptions could impact traditional and emerging business models and make it difficult to remain competitive. • New entrants, including tech firms, offering innovative services in the mobility sector. • Economic downturns impacting customer willingness to adopt new models like subscription services. • Competitive pressures from companies that have already fully transitioned to new business models, especially in markets where digital and green technologies are more advanced. • Non-existent regulations

Figure 6: New Business Models SWOT analysis

5 CONCLUSIONS

TRIEME WP2 Task 2.3 (part of D2.1) has successfully gathered an initial round of results following a bottom-up approach by focusing on key themes such as digitalization, green sustainability, value chain resilience, and new business models. This series of workshops marked the beginning of further discussions aimed at capturing the evolving perspectives and challenges within the automotive-mobility ecosystem. Importantly, these workshops also serve as a basis for a deeper dive into the skills needs, job roles and necessary education and trainings required to support these transformations. The insights shared in this report will provide a foundation for the future project activities and for other WPs, as the project continues to engage stakeholders, refine strategies, and address emerging trends.

6 ANNEXES

This annex contains supporting documents for the workshop events.

6.1 SUPPORTING DOCUMENTS: TRIEME CONFERENCE 10/04/2024

The TRIEME conference was organized in Brussels in the framework of the TRIEME project to officially kick off the project. It represented a good occasion to start the work on investigating the skills intelligence and introducing the trends on Digitalization, Sustainability, Circular Economy, Value Chain Resilience, and New Business Models. Therefore, also the outcomes of such conference were considered as part of the results to be gathered in chapter 4. The agenda of the event is presented below.

AGENDA

12:30 – 13:30 | Registration and Light Lunch

13:30 – 13:50 | Welcome

- **Jakub Stofa**, President of the Automotive Skills Alliance (ASA)
- **Ann Branch**, Head of Unit, DG EMPL, European Commission

13:50 – 15:00 | Panel Discussion

Moderator: Petr Dolejš, ACEA

- **Lorena Ionita**, Deputy Head of Unit, DG GROW, European Commission
- **Thomas Wobben**, Director, Committee of the Regions
- **David Storer**, Director of Research, Innovation, and New Mobility, CLEPA
- **Isabel Sobrino**, Senior Policy Advisor, Ceemet
- **Benjamin Denis**, Senior Policy Advisor, IndustriAll Europe

15:00 – 15:30 | Coffee Break

15:30 – 16:30 | Workshop 1: Skills Intelligence & Anticipation

All workshop participants will actively discuss and elaborate on the challenges, actions and best practices related to the skills needs gathering on European, national and regional levels and how to ensure its continuous update while reflecting the latest trends in the transformation of the automotive-mobility ecosystem. The participants will also reflect on the skills intelligence descriptions and their practical use e.g. in industry, education and training providers.

16:30 – 17:00 | Coffee Break

17:00 – 18:00 | Workshop 2: Education, Training Development and Delivery

All workshop participants will actively discuss and elaborate on the challenges, actions and best practices related to education and training, courses development and update, courses delivery effectiveness, as well as recognition of competencies, and access, integration and flexible update of new courses content in initial and continuous education and training.

18:00 – 18:15 | Wrap-up and Closure

- **Petr Dolejš**, Mobility & Sustainable Transport Director, ACEA

Figure 7: TRIEME Conference Agenda

LIST OF PARTICIPANTS

ORGANIZATION	
VSB-TUO	CECRA
Trnava Region	EUPPY
ASA	Vamia
DG Empl – EU Commission	FGB
ACEA	BME
Committee of Regions	Skelleftea
CLEPA	MOBINOV
CEEMET	Newton University
CFTC	Castilla y Leon
ATEC	Saxony
Transilvania IT Cluster	Auvergne Rhone Alpes
EuroSPI	LES
UCRS	Stuttgart Region
HETEL	ITC
EDUCAM	University of Maribor
SFC Confindustria	IBBF
ETRMA	Merinova

6.2 SUPPORTING DOCUMENTS: WORKSHOP 19/06/2024

The second workshop was held in the framework of the event “Workshop Future Skills for the Battery Industry” organized by e-mobil BW, the Cluster Electric Mobility South-West and CELEST in Stuttgart on June 19, 2024. Agenda and list of participants (organizations) is presented in the below tables.²

AGENDA

TIME	TOPIC
14.00	Welcome
14.10	TOP 1: Current developments in battery technology and future prospects
14.30	TOP 2: Current flagship projects – Benefits for SMEs - <i>QualiBatt BW, VOLTAGE & TRIEME</i>
15.15	<p>TOP 3: Interactive workshop format</p> <p><i>Workshop 1: Battery value chain: current challenges, urgently needed skills and "meaningful" support for training and further education – QualiBatt BW/Voltage</i></p> <p>The aim of the workshop is to identify the current challenges in training and recruiting employees, urgently needed skills and "meaningful" formats of support for training and further education along the battery value chain.</p> <p>-</p> <p>Workshop 2: Automotive sector key trends: shared understanding of skills, occupations and training development –TRIEME</p> <p>This workshop will deep dive into the main automotive-mobility sector key trends in order to gather insights and develop a shared understanding to address the needs of its current and future workforce in terms of skills, occupations and training development.</p> <p><i>Workshop 3: Graduate training across the entire spectrum of electrochemical energy storage: dialogue formats between science and industry – CELEST</i></p> <p>The workshop focuses on how the interaction between doctoral researchers and industry can be meaningfully designed and intensified through suitable meeting and exchange formats.</p>
16.15	Networking and end

² More information of the event can be found at: <https://www.e-mobilbw.de/en/service/event-detail/workshop-future-skills-for-the-battery-industry>

LIST OF PARTICIPANTS

**In yellow: organizers of the workshop*

Organization	
ads-tec energy GmbH	Schuler Group
Wirtschaftsförderung Region Stuttgart	P3 Automotive GmbH
EDAG Production Solutions GmbH & Co. KG	Zentrum für Sonnenenergie- und Wasserstoff-Forschung Baden-Württemberg
Sistemi Formativi Confindustria - SFC	Bildungswerk der Baden-Württembergischen Wirtschaft e.V.
Deutsches Zentrum für Luft- und Raumfahrt e.V.	Bildungswerk
Göteborgsregionen/Gothenburg Region	MGSP
e-mobilBW GmbH	Purem GmbH
Bosch Rexroth	Purem GmbH
Center for Electrochemical Energy Storage Ulm & Karlsruhe (CELEST) / Karlsruhe Institute of Technology (KIT)	MRPLAN Group
VDI/VDE-IT	Helmholtz-Institute Ulm (HIU)
Fraunhofer Institute for Industrial Engineering IAO	Business Region Göteborg
Würth Elektronik eiSos	Cluster Electric Mobility South-West c/o e-mobil BW GmbH
ads tec energy	

6.3 SUPPORTING DOCUMENTS: WORKSHOP 27/06/2024

A third workshop was held in the framework of the “Grand Est Study Visit” which was held on June 27-28 in Strasbourg & Metz area. Agenda and list of participants is presented in the below table.³

AGENDA

TIME	TOPIC
14.00-14.30	Launch of the meeting <ul style="list-style-type: none"> Valérie DEBORD, Vice-President in charge of Employment, Training, Guidance and Apprenticeships (video) Jakub STOLFKA, President of the ASA
14.30-14.45	The automotive industry in the Grand Est: Key figures <ul style="list-style-type: none"> Julien LECLERC, Head of Department OREF Grand Est (Regional Employment & Training Observatory)
14.45-16.15	Round Table: National and regional strategies to support changes in skills in the automotive industry <ul style="list-style-type: none"> Caroline COHEN, Director of Employment and Training, The Automotive Platform (PFA) Alexis SACCARDO, Regional Manager, Mobilians Grand Est and Sylvie ALBRECHT, Regional Manager, ANFA Angélique ALBERTI, Regional Director, DREETS Grand Est Claire COUDY, Deputy Director General, Grand Est Region Q&As
16.15-16.45	Coffee Break
16.45-17.45	Round table: Support for companies and the public in the sector: training and attractiveness <ul style="list-style-type: none"> Didier NEU, Project manager, Vehicle of the future competitiveness cluster Katia ALLARD, Operational director, Campus of profession and of qualifications – excellence mobility and embedded digital (Campus des Qualifications Excellence Mobilités et numérique embarqué) Aline WAGNER, Project Manager, Grand Est Region Q&As

³ More information of the event can be found at: <https://automotive-skills-alliance.eu/wp-content/uploads/2024/05/ASA-Study-Visit-Grand-Est-Full.pdf>

LIST OF PARTICIPANTS

Organization	
Renault	Campus des Qualifications Excellence Mobilités et numérique embarqué
André Citroën Vocational School	ATEC
Grand Est Region	ACEA
ASA	InnoEnergy Skills Institute
OREF Grand Est (Regional Employment and Training Observatory)	LHH
Mobilians Grand Est	CEPRA
ANFA	WRS – Stuttgart Region Regional Office
DREETS Grand Est	VSB-TUO
Vehicle of the Future Competitiveness Cluster	Trnava Region

6.4 SUPPORTING DOCUMENTS: WORKSHOP 05/09/2024

A fourth workshop was held in the framework of the 31st EuroSPI Conference (4 - 6 September 2024, Munich, Germany). In this context, inputs were gathered during the thematic workshop “ASA Automotive Skills Alliance - The New Initiative TRIEME - Re-skilling Strategies for European Car Industry (2024 - 2028)”, which was held on September 5th, 2024. The full agenda, list of organisations, and description of the event can be found at:

<https://conference.eurospi.net:7081/index.php/en/programme/conference-programme>

Organization	
ASQF	Whitebox
Methodpark	ISCN GmbH
SOQRATES	KTM Informatics GmbH
Volkswagen AG	Graz University of Technology
AUDI AG	DRÄXLMAIER Group
ASA (Automotive Skills Alliance)	Coroplast Group
ACEA (European Automobile Manufacturers' Association)	Festo SE & Co. KG
KVALB	ARENA2036 e.V.
EuroSPI GesmbH	Komax AG
Hochschule München	UL (University of Limerick)
Carnegie Mellon University	Science Foundation Ireland Research Centre for Software
Software Engineering Institute	Magility
ABB	Valeo
Lero	AVL
International Society for Software Process (ISSPA)	

6.5 SUPPORTING DOCUMENTS: WORKSHOP 09/09/2024

A fifth workshop was held in the framework of the program "Turn2Coach: the metacompetencies of the VET trainer", promoted by the ITS Meccatronico del Lazio Academy Foundation with the support of SFC Sistemi Formativi Confindustria in Italy. In this context, the workshop contributed to the thematic area "Innovation in the Automotive sector at a transnational level: possible impacts on emerging professional profiles". This workshop gathered technicians, managers and experts in the quality systems of the companies in the mechanical and mechatronics cluster appointed as teachers for the courses "Diploma di tecnico superiore per la progettazione e la produzione meccatronica avanzata" and "Diploma di tecnico superiore per l'automazione e la robotica industriale". Agenda of the event (morning session) and list of participating organizations can be found below.⁴

AGENDA

TIME	TOPIC
9.30	Participant registration and welcome coffee
10.10	Opening remarks
10.10-10.20	Challenges and opportunities for the growth of individuals, companies, and the region Dr. Miriam Diurni, President of the ITS Meccatronico del Lazio Academy Foundation
10.20-10.30	ITS scenarios to support educational excellence and high technological specialization Prof. Luca Sorrentino, University of Cassino and Southern Lazio, President of the Technical Scientific Committee of the ITS Meccatronico del Lazio Academy Foundation
10.30-10.50	The challenges and opportunities of becoming Higher Technicians Testimonies from former students of the ITS Meccatronico del Lazio Academy Foundation
10.50-11.20	Innovation in the Automotive sector TRIEME for Automotive in Europe: drivers for R&D and emerging skills Dr. Elisa Pagliaroli, Strategic Consultant, SPIN360 TRIEME
11.20-12.00	Interactive approach to the development dynamics and criticalities of the Automotive sector and its supply chain Eng. Vincenzo Vitiello, Cybersecurity Consultant, Sistemi Formativi Confindustria
12.00-12.30	Mechatronics and Automotive: alternative and renewable energies Dr. Paolo Marini, CEO, Tecnobus S.p.A.
12.30	End of the second session

⁴ The event was held in Italian and for the purpose of this report the material was translated into English

LIST OF PARTICIPANTS

Organization	
ABB	POWER4FUTURE
BITRON	PSC
CREA	REFAS
EUROPLASTICS	Self Garden
Froneri Italy	Sicamb
Haleon	STUDIO TORTA
ICAP Group	Tassinari Group
Indexa	TECNAVAN
INFN	TMP Engineering
Ital Tractor	UNICAMPUS
Lanxsess	UNICAS
Lazio Innova	Unindustria
LV GROUP	WUERTH
Mappi	AVIO
Ometec	VETRECO
OMRON	